

METHOD OF COATING AND METHOD OF BONDING

FIELD OF THE INVENTION

This invention relates to coatings.

BACKGROUND OF THE INVENTION

5 It is known from GB-A-2207089 that powder coatings may be used for bonding two surfaces together by exploiting the melt phase to wet out the surfaces prior to effecting full cure to establish the bond. In normal circumstances, especially when the bond is required
10 between sheets or other large-area surfaces, it is found necessary to employ nip rolling or other pressure-applying means (mechanical or vacuum) to enable a good laminate to be produced. Application of pressure, however, tends to press out the melted powder, and this
15 can be of significant disadvantage where the powder is to provide a coloured or opaque coating to a glass or other transparent or translucent substrate. The applied pressure may result in thinning or pressing out of the melt such that on curing there is no solidity and
20 uniformity of coating-colour or -opacity and the backing to the coating shows through. It is one of the objects of the present invention to provide a method of bonding by which such problems can be avoided.

SUMMARY OF THE INVENTION

25 According to one aspect of the present invention there is provided a method of coating wherein different thermosetting materials are laid down in powder form one upon the other on a substrate, and heat is applied to melt and fuse the powders into respective coatings bonded
30 together on the substrate.

The powders may have different rates of cure from one another, and in these circumstances, the higher cure-rate powder may be laid down as a first layer on the
35 substrate, and the lower cure-rate powder may be laid down as a second layer on the first layer. The lower and higher cure-rate materials may be, for example, epoxy,

polyester, or acrylic materials. Powder coatings can be produced with a variety of cure-rate windows so as to give markedly different rates of cure. The powders are commonly characterised in this regard as 'high-bake' ('low cure-rate') or 'low-bake' ('high cure-rate'); the terms 'high-bake' and 'low cure-rate' distinguish from the terms 'low-bake' and 'high cure-rate' in that a 'high-bake' or 'low cure-rate' material takes longer to cure at any given temperature than a 'low-bake' or 'high cure-rate' material.

With the method of the invention it is readily possible to obtain a good laminate without the disadvantage of thinning or pressing out of the melt, and in particular to avoid show-through where colour or opacity is required with a transparent or translucent substrate. In the latter respect, and using materials of different cure-rates, the higher cure-rate material may provide a coating with colour or opacity on a transparent or translucent substrate and the lower cure-rate material may be applied to it while the higher cure-rate material is in its initial un-cured state or at least still not fully cured. When this latter material hardens to form a solid and uniform coating, the lower cure-rate material is still in a state to wet the higher cure-rate coating and the backing surface that is pressed onto it, until curing is complete. Even if the pressure applied to the backing to complete the laminate during curing of the lower cure-rate material, presses out that material to be very thin, the already-cured solid-colour or opaque coating visible through the substrate, remains unaffected.

According to another aspect of the present invention there is provided a method of bonding two surfaces together wherein the bond is effected using two bonding materials that have different cure-rates, the material of

lower cure-rate being applied to the material of higher cure-rate while this latter material is in the uncured state, prior to curing of both.

BRIEF DESCRIPTION OF THE DRAWINGS

- 5 Methods of coating and bonding in accordance with the present invention will now be described, by way of example, with reference to the accompanying drawings. in which:
- 10 Figure 1 is illustrative of a laminate manufactured according to the method of the invention;
- Figure 2 is illustrative of a laminate door-panel manufactured according to the method of the invention;
- 15 and
- Figures 3 and 4 are illustrative of the manufacture of further laminate panels, according to the invention.
- DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS
- 20 Referring to Figure 1, two coats 1 and 2 of thermally-curing powder are applied one upon the other on a substrate 3. The base coat 1 is a low-bake powder (high cure-rate) and is applied to a surface 4 of the substrate 3. While the powder of the coat 1 is still uncured, the
- 25 second coat 2, which is of a higher-bake cure-window (lower cure-rate), is deposited on it. Heat is then applied to melt both coats 1 and 2, the base coat 1 softening and then hardening first to effect a good bond with the surface 4. The second coat 2 remains wet to
- 30 ensure good bonding between the cured coat 1 and a backing 5 that is pressed, for example by a nip roller (not shown), onto the coating 2. The applied pressure may press out the melted powder of the coat 2 until curing of the coat 2 is complete, but the first-hardened
- 35 coat 1 remains substantially unaffected and continuous.